

Appl. No. 09/925,261  
Reply to Office action of 01/30/2004

Page 2

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

Claim 1 (currently amended): A process for the fluidized catalytic cracking of a hydrocarbon feedstock comprising:

- passing a hydrocarbon feedstock and solid catalyst particles into a reaction conduit to produce a mixture of solid catalyst particles and gaseous fluids;
- inducing said mixture of said catalyst particles and gaseous fluids to swirl in a first angular direction to decrease the a catalyst particle concentration and increase the a gaseous fluids concentration in said mixture;
- transporting said mixture through a conduit to at least one cyclone; and
- inducing said mixture in said cyclone to swirl in a second angular direction that is counter to the first angular direction to further decrease the catalyst particle concentration and further increase the gaseous fluids concentration in said mixture.

Claim 2 (original): The process of claim 1 wherein said mixture exits said reaction conduit through a swirl arm to induce swirling in said first angular direction.

Claim 3 (original): The process of claim 1 wherein said mixture is transported from said reaction conduit to said cyclone in a gas recovery conduit.

Claim 4 (original): The process of claim 3 wherein said cyclone directly communicates with said gas recovery conduit.

Claim 5 (original): The process of claim 1 wherein said mixture exits from said reaction conduit into a separation vessel and said gas recovery conduit directly communicates with said separation vessel.

Claim 6 (original): The process of claim 1 further including depositing catalyst particles removed from said mixture in said cyclone into a stripping zone, contacting said catalyst particles with a stripping gas in said stripping zone, recovering stripped catalyst particles from said stripping zone and collecting gaseous fluids from said stripping zone.

Claim 7 (original): The process of claim 1 wherein said mixture continues to swirl in said first angular direction while it is transported to the cyclone.

Appl. No. 09/925,261  
Reply to Office action of 01/30/2004

Page 3

Claim 8 (currently amended): An apparatus for the fluidized catalytic cracking of a hydrocarbon feedstock comprising:

a reaction conduit for contacting a hydrocarbon feedstock and solid catalyst particles to produce a mixture of solid catalyst particles and gaseous fluids, said reaction conduit having a swirl exit configured to induce the solid catalyst particles and gaseous fluids to swirl in a first angular direction;

a gas recovery conduit in communication with said swirl exit; and

a cyclone in communication with said ~~swirl exit~~ gas recovery conduit, said cyclone having a swirl inducing outer wall that induces the solid catalyst particles and gaseous fluids to swirl in a second angular direction that is counter to the first angular direction.

Claim 9 (original): The apparatus of claim 8 wherein the swirl exit comprises a tubular swirl arm with one end connective with the reaction conduit and an opening at the opposite end.

Claim 10 (original): The apparatus of claim 9 wherein said swirl arm curves about an axis that is parallel to said reaction conduit.

Claim 11 (original): The apparatus of claim 10 wherein said opening at said opposite of said swirl arm defines a swirl direction toward said swirl inducing outer wall of said cyclone.

Claim 12 (original): The apparatus of claim 8 wherein the swirl exit is positioned in a separation vessel.

Claim 13 (original): The apparatus of claim 8 wherein a gas recovery conduit communicates the swirl exit of the reaction conduit with the cyclone.

Claim 14 (original): The apparatus of claim 8 wherein said cyclone includes a centrally disposed gas outlet and the first angular direction of swirl induced by the swirl exit of the reaction conduit is primarily toward said swirl-inducing outer wall at an inlet to the cyclone.

Claim 15 (original): The apparatus of claim 8 which is a part of an entire fluidized catalytic cracking unit.

Claim 16 (currently amended): An apparatus for the fluidized catalytic cracking of a hydrocarbon feedstock comprising:

a reaction conduit for contacting a hydrocarbon feedstock and solid catalyst particles to produce a mixture of solid catalyst particles and gaseous fluids, said reaction conduit having a curved tubular swirl arm connective with said reaction conduit and an open exit end;

Appl. No. 09/925,261  
Reply to Office action of 01/30/2004

Page 4

a gas recovery conduit in communication with said open exit end of said swirl arm;  
and

a cyclone in communication with said gas recovery conduit ~~open exit end of said swirl arm~~, said cyclone having a curved outer wall; wherein said swirl arm curves in an angular orientation counter to the angular orientation in which said outer wall of the cyclone curves.

Claim 17 (original): The apparatus of claim 16 wherein said swirl arm curves about an axis that is parallel to said reaction conduit.

Claim 18 (original): The apparatus of claim 16 wherein the open exit end is positioned in a separation vessel.

Claim 19 (original): The apparatus of claim 16 wherein a gas recovery conduit communicates the open exit end of the swirl arm with the cyclone.

Claim 20 (original): The apparatus of claim 16 which is a part of an entire fluidized catalytic cracking unit.